Glanders
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Glanders

Overview [1,2]

For a complete description of glanders, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM).
- The Merck Veterinary Manual.

NOTE: Glanders is a potential bioterrorism weapon. **If the case has no remarkable travel history and is not employed in an occupation that is prone to exposure, a bioterrorism event should be considered.** If you suspect that you are dealing with a bioterrorism situation, contact your Regional Communicable Disease Coordinator immediately.

Case Definition

Clinical description

Disease in humans can occur in four basic forms: acute localized infection, septicemic illness, acute pulmonary infection, or chronic cutaneous infection. Symptoms include fever, malaise, pleuritic chest pain, cervical adenopathy, splenomegaly, and generalized papular/pustular eruptions. Mortality rate is over 50% despite antibiotic treatment.

Laboratory criteria for diagnosis

Isolation of *Burkholderia mallei* from blood, sputum, urine, or skin lesions. Serologic assays are not available.

Case classification [3]

Confirmed: a clinically compatible case that is laboratory confirmed

Probable: a clinically compatible case that is epidemiologically linked to a confirmed case

Information Needed for Investigation

Verify the diagnosis. Determine what laboratory tests were conducted and the results.

Establish the extent of illness. Determine if household or other close contacts are, or have been, ill by contacting the health care provider, patient or family member.

Determine the occupation of the index case since this information may help narrow the search for the route of exposure.

Determine if the case had a history of foreign travel. Glanders is endemic in Africa, Asia, the Middle East, and Central and South America. Collect the dates of travel to determine if the incubation period is compatible with the potential period of exposure. The incubation period of

glanders is variable, ranging from 1 to 5 days for infections of the skin to several weeks for chronic infections.

Contact the Regional Communicable Disease Coordinator to assist in the investigation. If it appears the disease was acquired locally and is apparently of livestock origin, the Coordinator will alert the State Public Health Veterinarian who will alert the Missouri Department of Agriculture.

Case/Contact Follow Up And Control Measures

Glanders is primarily a disease affecting horses, but it also affects donkeys and mules and can be naturally contracted by goats, dogs, and cats. Glanders is transmitted to humans by direct contact with infected animals. The bacteria enter the body through the skin and through mucosal surfaces of the eyes and nose. Sporadic cases have been documented in veterinarians, horse caretakers, and laboratorians. The symptoms of glanders depend upon the route of infection with the organism. The types of infection include localized, pus-forming cutaneous infections, pulmonary infections, bloodstream infections, and chronic suppurative infections of the skin. Generalized symptoms of glanders include fever, muscle aches, chest pain, muscle tightness, and headache. Additional symptoms have included excessive tearing of the eyes, light sensitivity, and diarrhea.

If terrorist activity is suspected, contact appropriate law enforcement authorities.

- Contact the Regional Communicable Disease Coordinator.
- Complete the "Biological Event Data Collection Questionnaire" for all exposed persons. The questionnaire can be found in the Appendix Section.
- Determine the source of infection to prevent other cases:
  - Does the case work with animals, especially horses, donkeys, and mules?
  - Has the case traveled out of the country, especially to places where glanders is currently known to be occurring? Contact your Regional Communicable Disease Coordinator for a list of countries.
  - Does the case or his/her close associates know of any other similar cases?

NOTE: If the case has no remarkable travel history and is not employed in an occupation that is prone to exposure, a bioterrorism event ***must*** be considered. Determine **all** activities of the case within the previous seven days, particularly attendance at events with large numbers of people. Notify the Regional Communicable Disease Coordinator.

Control Measures

- Humans: In addition to animal exposure, cases of human-to-human transmission have been reported. These cases included two suggested cases of sexual transmission and several cases in family members who cared for the patients. There is no human vaccine available for glanders.

In countries where glanders is endemic in animals, prevention of the disease in humans involves identification and elimination of the infection in the animal population. Within the health care setting, transmission can be prevented by using common blood and body fluid precautions. Because human cases of glanders are rare, there is limited information about antibiotic treatment of the organism in humans. Sulfadiazine has been found to be effective in experimental animals and in humans. *Burkholderia mallei* is usually sensitive to tetracyclines, ciprofloxacin, streptomycin, novobiocin, gentamicin, imipenem, ceftrazidime, and the sulfonamides. Resistance to chloramphenicol has been reported.

- Animals: There is no animal vaccine. Prevention and control depend on early detection and elimination of affected animals, as well as complete quarantine and rigorous disinfection of the area involved. Treatment is given only in endemic areas. Antibiotics are not very effective. Combinations of sulfazine or sulfamonomethoxine with trimethoprim were found to be efficient in the prevention and treatment of experimental glanders.

Laboratory Procedures

Specimens:

The State Public Health Laboratory can culture *Burkholderia mallei* from various specimens. Information on laboratory procedures can be obtained from the SPHL: telephone 573-751 0633; web site: http://www.dhss.state.mo.us/Lab/index.htm. (28 May 2003)

Reporting Requirements

Glanders is a Category I(B) disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services (DHSS) within 24 hours of first knowledge or suspicion by telephone, facsimile or other rapid communication.

1. For all cases, complete a “Disease Case Report” (CD-1) and send the completed form to the DHSS Regional Health Office.
2. For all cases, complete a “Record of Investigation of Communicable Disease” (CD-2).
3. Entry of the completed CD-1 into the MOHSIS database negates the need for the paper CD-1 to be forwarded to the Regional Health Office.
4. Send the completed secondary investigation form to the Regional Health Office.
5. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the Regional Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
6. Within 90 days of the conclusion of an outbreak, submit the final outbreak report to the Regional Communicable Disease Coordinator.

References

1. Chin, James ed. "Glanders." Control of Communicable Diseases Manual. 17th ed. Washington, DC: American Public Health Association, 2000: 337-338.
2. The Merck Veterinary Manual. 8th Ed. Ed. Susan E. Aiello. Whitehouse Station, NJ: Merck & Co., Inc., 1998: 502, 2164. http://www.merckvetmanual.com/mvm/index.jsp (search "glanders"). (28 May 2003)
3. Missouri Department of Health and Senior Services - Section for Communicable Disease Prevention, surveillance case definition.

Other Sources of Information

1. Centers for Disease Control and Prevention, Disease Information, "Glanders, General Information." http://www.cdc.gov/ncidod/dbmd/diseaseinfo/glanders_g.htm#prevent (28 May 2003)
2. Centers for Disease Control and Prevention, Disease Information, "Glanders, Technical Information." http://www.cdc.gov/ncidod/dbmd/diseaseinfo/glanders_t.htm (28 May 2003)
3. Centers for Disease Control and Prevention, Laboratory-Acquired Human Glanders--Maryland, May 2000. MMWR, 2000; 49 (24); 532-5. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4924a3.htm (28 May 2003)
4. Centers for Disease Control and Prevention, Public Health Emergency Preparedness and Response, http://www.bt.cdc.gov/Agent/agentlist.asp (28 May 2003)

Glanders

FACT SHEET

What is glanders?

Glanders is an infectious disease that is caused by the bacterium *Burkholderia mallei.* Glanders is primarily a disease affecting horses, but it also affects donkeys and mules and can be naturally contracted by goats, dogs, and cats. Human infection, although not seen in the United States since 1945, has occurred rarely and sporadically among laboratory workers and those in direct and prolonged contact with infected, domestic animals.

Why has glanders become a current issue?

Burkholderia mallei is an organism that is associated with infections in laboratory workers because so very few organisms are required to cause disease. The organism has been considered as a potential agent for biological warfare and of biological terrorism.

How common is glanders?

The United States has not seen any naturally occurring cases since the 1940s. However, it is still commonly seen among domestic animals in Africa, Asia, the Middle East, and Central and South America.

How is glanders transmitted and who can get it?

Glanders is transmitted to humans by direct contact with infected animals. The bacteria enter the body through the skin and through mucosal surfaces of the eyes and nose. Sporadic cases have been documented in veterinarians, horse caretakers, and laboratorians.

What are the symptoms of glanders?

The symptoms of glanders depend upon the route of infection with the organism. The types of infection include localized, pus-forming cutaneous infections, pulmonary infections, bloodstream infections, and chronic suppurative infections of the skin. Generalized symptoms of glanders include fever, muscle aches, chest pain, muscle tightness, and headache. Additional symptoms have included excessive tearing of the eyes, light sensitivity, and diarrhea.

Localized infections: If there is a cut or scratch in the skin, a localized infection with ulceration will develop within 1 to 5 days at the site where the bacteria entered the body. Swollen lymph nodes may also be apparent. Infections involving the mucous membranes in the eyes, nose, and respiratory tract will cause increased mucus production from the affected sites.

Pulmonary infections: In pulmonary infections, pneumonia, pulmonary abscesses, and pleural effusion can occur. Chest X-rays will show localized infection in the lobes of the lungs.

Bloodstream infections: Glanders bloodstream infections are usually fatal within 7 to 10 days.

Chronic infections: The chronic form of glanders involves multiple abscesses within the muscles of the arms and legs or in the spleen or liver.

Where is glanders usually found?

Geographically, the disease is endemic in Africa, Asia, the Middle East, and Central and South America.

How is glanders diagnosed?

The disease is diagnosed in the laboratory by isolating *Burkholderia mallei* from blood, sputum, urine, or skin lesions. Serologic assays are not available.

Can glanders spread from person to person?

In addition to animal exposure, cases of human-to-human transmission have been reported. These cases included two suggested cases of sexual transmission and several cases in family members who cared for the patients.

Is there a way to prevent infection?

There is no vaccine available for glanders. In countries where glanders is endemic in animals, prevention of the disease in humans involves identification and elimination of the infection in the animal population. Within the health care setting, transmission can be prevented by using common blood and body fluid precautions.

Is there a treatment for glanders?

Because human cases of glanders are rare, there is limited information about antibiotic treatment of the organism in humans. Sulfadiazine has been found to be effective in experimental animals and in humans. *Burkholderia mallei* is usually sensitive to tetracyclines, ciprofloxacin, streptomycin, novobiocin, gentamicin, imipenem, ceftrazidime, and the sulfonamides. Resistance to chloramphenicol has been reported.

Extracted from: Centers for Disease Control and Prevention, Disease Information, "Glanders, General Information."
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/glanders_g.htm#prevent
(28 May 2003)

Missouri Department of Health and Senior Services
Section for Communicable Disease Prevention
Phone: (866) 628-9891 or (573) 751-6113

MISSOURI DEPARTMENT OF HEALTH

DISEASE CASE REPORT

(INSTRUCTIONS ON REVERSE SIDE)

REPORT TO LOCAL PUBLIC HEALTH AGENCY

DATE RECEIVED BY LOCAL HEALTH AGENCY

A. CASE IDENTIFICATION (ALL DISEASES)

NAME (LAST, FIRST, M.I.) | DATE OF BIRTH (MO/DAY/YR) | AGE | TELEPHONE NUMBER ( )

ADDRESS (STREET OR RFD, CITY, STATE, ZIP CODE) | MEDICAL RECORD NUMBER | GENDER ☐ M ☐ F

COUNTY OF RESIDENCE | PATIENT DIED OF THIS ILLNESS ☐ YES ☐ NO | PARENT OR GUARDIAN IF A MINOR

PATIENT EMPLOYED? ☐ YES ☐ NO | SCHOOL/DAY CARE/WORKPLACE AND OCCUPATION | ETHNIC ORIGIN ☐ HISPANIC ☐ NOT HISPANIC

RACE ☐ BLACK ☐ ASIAN/PACIFIC ISLANDER ☐ MIXED ☐ WHITE ☐ AMERICAN INDIAN ☐ OTHER (SPECIFY) _____ | PATIENT'S COUNTRY OF ORIGIN | DATE ARRIVED IN U.S.A.

WAS PATIENT HOSPITALIZED? ☐ YES ☐ NO | ARRIVED BY AMBULANCE? ☐ YES ☐ NO | OTHER CASES? ☐ YES ☐ NO ☐ UNKNOWN

RESIDE IN NURSING HOME? ☐ YES ☐ NO | NOSOCOMIAL INFECTION? ☐ YES ☐ NO

NAME OF HOSPITAL/NURSING HOME | ADDRESS

B. PERSON OR AGENCY REPORTING

NAME | DATE OF REPORT (MO/DAY/YR) | TELEPHONE NUMBER ( )

ADDRESS | ☐ PHYSICIAN ☐ OUTPATIENT CLINIC ☐ LABORATORY ☐ HOSPITAL ☐ PUBLIC HEALTH CLINIC ☐ SCHOOL

ATTENDING PHYSICIAN NAME | ADDRESS | TELEPHONE NUMBER ( )

C. DISEASE

DISEASE | PLEASE INCLUDE CONFIRMATORY LABORATORY DATA (ATTACH COPY IF AVAILABLE) DATES | TYPE OF TEST | RESULT | LAB NAME/LOCATION

DATE OF ONSET (MO/DAY/YR) | DATE OF DIAGNOSIS (MO/DAY/YR) | LEAD ☐ VENOUS ☐ CAP | COMMENTS

PLEASE COMPLETE THE APPROPRIATE SECTION FOR THE DISEASE BEING REPORTED

SEXUALLY TRANSMITTED DISEASES

D. SYPHILIS

- ☐ PRIMARY (CHANCRE PRESENT)
- ☐ SECONDARY (SKIN LESIONS, RASH, ETC.)
- ☐ EARLY LATENT (ASYMPTOMATIC, LESS THAN 1 YEAR)
- ☐ LATE LATENT (OVER 1 YEAR DURATION)
- ☐ NEUROSYPHILIS
- ☐ CARDIOVASCULAR
- ☐ CONGENITAL
- ☐ OTHER

☐ **GONORRHEA** ☐ **CHLAMYDIA** (CHECK ABOVE BOXES AS APPROPRIATE)

- ☐ ASYMPTOMATIC
- ☐ UNCOMPLICATED UROGENITAL (URETHRITIS, CERVICITIS)
- ☐ SALPINGITIS (PID)
- ☐ OPHTHALMIA/CONJUNCTIVITIS
- ☐ OTHER (ARTHRITIS, SKIN LESIONS, ETC.)

DATE	TEST	RESULTS

TREATMENT NOT INDICATED BECAUSE: ☐ PREVIOUS ADEQ. TREATMENT ☐ FALSE POSITIVE

DATE OF PREVIOUS TREATMENT: _____

PREV. DISEASE/STAGE

PLACE:

HAS PATIENT BEEN TREATED? ☐ YES ☐ NO

DATE(S) OF TREATMENT

TYPE AND AMOUNT OF TREATMENT

ENTERIC DISEASES OR HEPATITIS

E. ENTERIC AND PARASITIC DISEASES AND HEPATITIS A

CHECK BELOW IF PATIENT OR MEMBER OF PATIENT'S HOUSEHOLD (HHLD):	PATIENT YES	PATIENT NO	PATIENT UNK	HHLD MEMBER YES	HHLD MEMBER NO	HHLD MEMBER UNK
IS A FOOD HANDLER						
ATTENDS OR WORKS AT A DAY CARE CENTER						
IS A HEALTH CARE WORKER						

TREATMENT

DRUG

DOSAGE

☐ NO TREATMENT

F. HEPATITIS ☐ A ☐ B ☐ C ☐ PRENATAL ☐ OTHER

(CHECK ALL TESTS PERFORMED)

JAUNDICED: ☐ YES ☐ NO

JAUNDICE ONSET DATE: _____

CARRIER? ☐ YES ☐ NO

ALT | AST

TEST	POS	NEG
HAV-IgM		
HBcAb-IgM		
HBsAg		
HBsAb		
HBcAb		
Hep C		

TUBERCULOSIS

G. ☐ **DISEASE** OR ☐ **INFECTION**

TUBERCULIN TEST (DATE)

RESULTS (MM INDURATION)

TYPE OF TEST (CHECK ONE)

- ☐ MANTOUX (5TU-PPD)
- ☐ MULTIPLE PUNCTURE DEVICE
- ☐ NOT DONE

X-RAY

- ☐ NORMAL (DATE) _____
- ☐ ABNORMAL (DATE) _____

(CHECK ONE)

- ☐ STABLE ☐ CAVITARY
- ☐ WORSENING ☐ NONCAVITARY
- ☐ IMPROVING
- ☐ NOT DONE
- ☐ UNKNOWN

PREVIOUS TB DISEASE

☐ YES ☐ NO ☐ UNK

BACTERIOLOGY

TYPE OF SPECIMEN

	POS	NEG	PENDING
SMEAR (DATE) _____	☐	☐	☐
CULTURE (DATE) _____	☐	☐	☐

REPORT DATE _____

☐ NOT STATED OR UNKNOWN ☐ NOT DONE

IF CULTURE POSITIVE:

- ☐ M. TUBERCULOSIS
- ☐ ATYPICAL MYCOBACTERIA (SPECIFY) _____

TREATMENT	DOSAGE
☐ ISONIAZID	
☐ ETHAMBUTOL	
☐ PYRAZINAMIDE	
☐ RIFAMPIN	
☐ OTHER (SPECIFY)	

DATE TREATMENT STARTED

MISSOURI DEPARTMENT OF HEALTH DISEASE CASE REPORT

TELEPHONE _____ or 1/800-392-0272

For Consultation or Information

All diseases listed below are to be reported promptly to the **local public health agency** or the Missouri Department of Health. **The diseases printed in boldface below must be reported immediately by telephone or fax.** Any enteric disease or hepatitis A in a foodhandler, health care worker, day care or correctional facility must be reported immediately by telephone. Other diseases/conditions should be reported within 3 days of first knowledge or suspicion.

Follow-up epidemiologic information may be requested by local or state public health officials.

(Legal authorization: RSMo 192.006 and 192.020; 19 CSR 20-20.020 and 19 CSR 20-080; local statutes and ordinances).

REPORTABLE DISEASES IN MISSOURI

Outbreaks: suspected outbreaks of reportable diseases, other acute or occupationally-related diseases or conditions

AIDS/HIV:
- AIDS*
- HIV seropositivity* (confirmed)
- T-Helper (CD4+) lymphocyte count* on any person with HIV infection

Animal bites
Anthrax
Aseptic meningitis
Botulism
Brucellosis
Chancroid
Diphtheria
Encephalitis, post infectious
Encephalitis, primary
Environmental/Occupational Conditions
- **Acute chemical poisoning**
- Carbon monoxide poisoning
- Heavy metal poisoning (lead, mercury, arsenic, cadmium and other)
- **Hyperthermia**
- **Hypothermia**
- Lead exposure
- **Methemoglobinemia**
- Occupational lung diseases
- **Pesticide poisoning**
- Respiratory diseaes triggered by environmental contaminants

Haemophilus influenzae disease, invasive, including meningitis
Kawasaki disease
Legionellosis
Leptospirosis
Lyme disease
Malaria
Measles
Meningococcal disease, invasive, including meningitis
Mumps
Nosocomial outbreaks
Pertussis
Plague
Poliomyelitis
Psittacosis
Rabies
Reye syndrome
Rocky Mountain spotted fever
Rubella
Tetanus
Toxic shock syndrome
Tularemia

SECTION D

SEXUALLY TRANSMITTED DISEASES:
- Chancroid
- Chlamydia trachomatis infections
- Gonorrhea
- **Syphilis**

SECTION E

ENTERIC AND PARASITIC DISEASES AND HEPATITIS A:
- Amebiasis
- Campylobacter infections
- Cholera
- E.coli O157:H7
- Giardiasis
- **Hepatitis A**
- Listeria monocytogenes
- Salmonella infections
- Shigella infections
- Trichinosis
- **Typhoid fever**
- Yersinia enterocolitica

SECTION F

HEPATITIS:
- **Hepatitis A**
- Hepatitis B
- Hepatitis B surface antigen (HBsAg) positive, pregnant women only
- Hepatitis non-A, non-B

SECTION G

TUBERCULOSIS:
- TB disease
- TB infection
- Disease from mycobacteria other than tuberculosis

***Use Forms CDC 50.42A AND MO 580-1641 for AIDS/HIV.**

MISSOURI DEPARTMENT OF HEALTH

RECORD OF INVESTIGATION OF COMMUNICABLE DISEASE*

FOR CODING ONLY

County		City	
Twnshp.		Disease	
Hospital			Source
Physician			

Patient's Name

Address | City | State | Zip Code

Birth / / | Sex ☐ M ☐ F | Race ☐ W ☐ N ☐ Other | County of Residence

Parent's Name If Not Adult | Phone

Hospitalized ☐ Yes ☐ No | Hospital Name | Date of Onset

Physician's Name | Phone Number

Address | Date

Previous Address (if significant) | Date Moved

Place Employed or School Attended | Occupation

Date Reported | How did you first learn of this case? | Date

Disease _____ ☐ Confirmed ☐ Suspected or } at beginning of investigation.

Chief Clinical Symptoms with Dates: _____

Treatment (type, amount, dates): _____

DIAGNOSTIC LABORATORY TESTS ON PATIENT

Type of Specimen	Date Collected	Result	Name of Laboratory

Are there other associated cases? _____ If yes, how many, and how associated? _____

Household Sanitation: ☐ Good ☐ Fair ☐ Poor

Milk Supply _____

Water Supply _____

(Continued on reverse side)

* Special forms should be used for investigations of Diphtheria (CD 2A), Encephalitis or Meningitis (CD 2B), Enteric Infections (CD 2C) and Foodborne Outbreaks (CD 2D).

Other Pertinent Epidemiological Data (exposure to birds and animals, insect bites, vaccination, travel, etc.): _____

CONTACTS (Household and Other)

Name and Address	Age / Sex	Relation to Patient	Similar Illness? Onset Date	Laboratory Specimen	Date Collected	Result

Narrative and Follow-up Notes: _____

Probable Source _____

☐ Recovered ☐ Died Date of Death _____ Cause of Death _____

Investigated by _____ Final Diagnosis _____

Name of Agency _____ Date _____